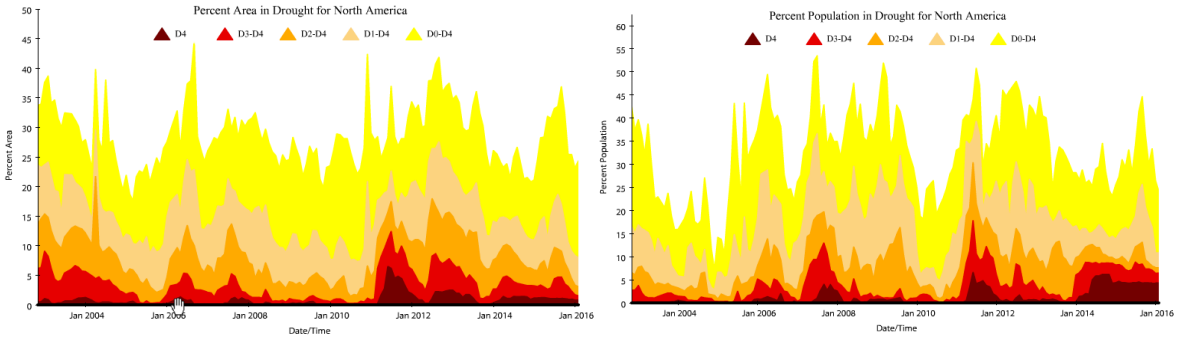
North American Drought Monitor – February 2016

At the end of February 2016, moderate to exceptional drought (D1-D4) affected approximately 8.0% of the area and 10.8% of the population of North America. This percentage is a decrease of 0.3% for area compared to the value for the end of January 2016. The population percentage for February is about the same as that for January.



CANADA: Throughout the month of February, many parts of Canada received normal to above-normal precipitation that resulted in improvement in overall drought conditions. Specifically, significant improvement occurred in Central and Eastern Canada, where many regions received monthly precipitation in excess of 150% of normal. Parts of the west have also seen improved conditions, especially throughout southern regions of British Columbia. The one exception was the southern Prairies, where well-above-normal temperatures and very low precipitation accumulation continued.

With above-normal precipitation and good snowpack and streamflow across much of the southern part of the province, B.C. continued to show significant improvement. Drought conditions impacted this region significantly during the past summer, when much of the region saw D2 and D3 conditions. Based on above-normal snow accumulations and improved streamflow, the remaining Abnormally Dry (D0) conditions have been scaled back to include only the southeastern tip of the province. However, the Moderate Drought (D1) continued to persist in parts of Northern B.C., where streamflow levels were well below normal, if not record low in certain regions. These dry regions extended towards Alberta, with the exception of a pocket of Moderate Drought (D1) that has been pulled back from Fort St. John in the wake of improved conditions in the past month.

Throughout February, abnormally warm weather reduced the snowpack in southern regions of the Prairies; however, central and northern regions began to receive some much-needed precipitation. Drought conditions across the three provinces remained fairly consistent, with some degradation in the southern areas. There was minimal snow cover across southern sections of Alberta and Saskatchewan, and in many parts in the southern one-quarter of both provinces, the only remaining snow was found to be in tree lines or on northern slopes of valleys. Although soil moisture was indicated as sufficient, given precipitation from the previous fall season, this region has undoubtedly dried out due to exposure; this, in combination with below-normal precipitation and above-normal

temperatures, has led to the development of Moderate Drought (D1) east of Calgary. In southern Saskatchewan, the Abnormally Dry (D0) designation now reaches nearly all the way from the Manitoba border towards Alberta. Across central portions of the two provinces, there was some slight improvement with increased snowfall. Snowfall throughout the North Battleford region of west-central Saskatchewan resulted in the reduction of D0 and D1. Changes to the northern portion of the Prairie Provinces were minimal: the area of Moderate to Severe Drought (D2 to D3) remained, with a slight improvement around Fort Vermillion. An area in northwestern Alberta recorded further drying conditions in February, which led to the expansion of Moderate Drought (D1). Across northern regions of Saskatchewan and Manitoba, satellite-derived data seemed to indicate adequate precipitation, but streamflow readings recorded levels to be very much below average. As a result, the Abnormally Dry (D0) conditions expanded just slightly northward in Saskatchewan, and eastward into Manitoba.

Over the 29-day period, much of southern Ontario, as well as southern Québec, received plenty of precipitation in the form of large storm events. Ottawa, in particular, recorded a one-day record of 51 cm of snowfall on February 16, 2016. Due to these large events, the abnormal dryness and drought conditions across much of the region were drastically reduced, with only an area from Toronto to Sarnia remaining Abnormally Dry (D0). A similar trend continued into Québec, where much of the Abnormal Dryness (D0) and Moderate Drought (D1) conditions were improved, and thus dropped. Only a small pocket of D0 remained surrounding Sherbrooke, as that area continued to suggest drier conditions, as well as an area around Trois-Pistoles, extending across parts of the Gaspé Peninsula. Despite the precipitation events across much of the southern portion of the province, this area continued to experience lingering Abnormal Dryness (D0) and Moderate Drought (D1) conditions.

Across the Atlantic Region conditions continued to improvement, but not as dramatically as other regions. The Abnormally Dry (D0) area across northeastern New Brunswick was pulled back almost entirely. There was also improvement across western parts of Newfoundland, but longer-term drought remained for southern and eastern portions of the island.

No significant changes were recorded for much of the northern region, as satellite-derived data appeared consistent with the previous month's assessment. There was a small region along the Mackenzie River that indicated adequate precipitation, and as a result, the patch of Abnormally Dry (D0) conditions was pulled away slightly. Otherwise, there were no northern changes.

UNITED STATES: For the second time in 3 months, warmth stretched nearly coast to coast, with only small sections of the southern Atlantic States and Intermountain West experiencing cooler-than-normal weather. Unlike December, when unprecedented warmth dominated areas from the Mississippi Valley to the East Coast, February's record-setting high temperatures were focused across the Plains. By February 29, only one-eighth (12.5%) of the contiguous U.S. was covered by snow, compared to 60.2% at the end of February 2015.

As a result, winter wheat prematurely broke dormancy across the central and southern Plains, leaving the crop vulnerable to potential spring freeze events. On the northern Plains, wheat lost some winter hardiness and was often buffeted by mild, breezy conditions. The Plains' most impressive warm spells peaked on February 18 and 27, with numerous monthly record highs established on both dates. During February, the portion of the winter wheat crop rated in good to excellent condition declined in Texas, from 49 to 40%, in part due to short-term dryness. Pockets of dryness also developed elsewhere across the southern half of the Plains. In contrast, early-month snowfall provided wheat with beneficial moisture across much of Nebraska, eastern Colorado, and northwestern Kansas.

Uncharacteristic of a strong, mature El Niño, February was unusually dry across much of the West. During February, the average water content of the high-elevation Sierra Nevada snowpack was nearly steady, with only minor storms affecting key watersheds. Since February is typically an important month for Sierra Nevada snowpack accumulation, the percent of historic average dropped from about 115% of average on February 1 to just 85% by month's end.

On March 1, approximately 36% of the western U.S. remained in drought, down from 57% in early-October 2015. Most (95%) of California was still in drought on March 1, down 2 percentage points from the beginning of the water year on October 1, 2015. However, California's coverage of exceptional drought (D4) has fallen from 46 to 38% since October 1. Farther north, extreme to exceptional drought (D3 to D4) in Oregon and Washington has been eradicated since the beginning of the water year—down from 67 and 68%, respectively.

On March 1, the Midwest remained free of drought, continuing a 9-week trend that began on January 5, 2016. The last time the Midwest was free of drought (D1 to D4) for a longer period was 2005, when there was no drought coverage for 12 consecutive weeks from February 15 to May 3. In addition, coverage of Midwestern abnormal dryness (D0) had never dropped below 1% until February 9, 2016, and ended the month at a record-low 0.90%—with records back to 2000.

An abundance of precipitation fell during February across most of the eastern one-third of the country, helping to eliminate the remaining pockets of moderate drought (D1). On February 2-3, 15-16, and 23-24, locally severe thunderstorms across the South and East accompanied the rain.

During the 4-week period ending on March 1, 2016, contiguous U.S. drought coverage fell to 14.30%—a decrease of 1.18 percentage points. This represented the smallest areal coverage of U.S. drought in nearly 5½ years, since October 12, 2010. The U.S. drought minimum of 2010—7.74% coverage on July 6—occurred in the wake of the most recently completed El Niño, which lasted from the summer of 2009 to the spring of 2010. Since mid-October 2015, stormy weather in many parts of the country—in part driven by the strong El Niño—significantly reduced U.S. drought footprint from 34.78 to 14.30%—a drop of 20.48 percentage points.

Outside of the mainland U.S., coverage of abnormal dryness (D0) in Alaska was unchanged during February at 10%. Puerto Rico's drought situation improved, with drought coverage decreasing from 42 to 19% during the month. Puerto Rico also experienced an elimination of extreme drought, which had covered 5% of the commonwealth at the end of January. In contrast, Hawaii's El Niño-driven drought continued to expand and intensify, covering more than half (54%) of the state by March 1. As recently as December 29, 2015, there had been no Hawaiian drought.

Historical Perspective: According to preliminary information provided by the National Centers for Environmental Information, the contiguous U.S. experienced its seventh-warmest, 46th-driest February during the 122-year period of record. The nation's monthly average temperature of 39.5°F (4.2°C) was 5.7°F (3.2°C) above the 1901-2000 mean, while the average precipitation of 1.93 inches (49.0 mm) was 91% of normal. Overall, it was the nation's warmest February since 2000.

All states reported a February average temperature in the upper (warm) half of the historical distribution. Florida, with its 59th-warmest February, was the "coolest" state. For a dozen states across the western and central U.S., as well as three states in New England, temperatures were among the ten highest respective February values on record. In Montana, where the monthly average temperature of 33.6°F (0.9°C) was 12.3°F (6.8°C) above the 20th century mean, it was the second-warmest February behind 1991. Meanwhile, state precipitation rankings ranged from the 14th-driest February in California to top-ten values for February wetness in New Hampshire, New York, Maine, and Vermont. California's monthly precipitation averaged 1.14 inches (29.0 mm), just 30% of normal.

Agricultural and Hydrological Highlights: On March 1, the portion of the U.S. winter wheat production area in drought stood at 6%, down from an autumn 2015 peak of 29% on October 20. At the end of February, the U.S. Department of Agriculture categorized more than two-thirds of the winter wheat in good to excellent condition in several major production states, including Ohio (72%), South Dakota (69%), Oklahoma (68%), and Indiana (67%). Across the central and southern Plains, however, February warmth caused winter wheat to prematurely break dormancy, leaving the crop susceptible to spring freezes. The northern Plains' wheat lost some winter hardiness and has become exposed to potential spring weather extremes. In addition, pockets of abnormal dryness (D0) developed across the Plains, with D0 expanding to cover 25% of Texas and 21% of Oklahoma by March 1—up from 2 and 0%, respectively, on February 2.

At the end of February, statewide reservoir storage remained significantly below average in several Western States. Specifically, statewide storage was about one-third of the historical average for this time of year in Nevada and was less than 80% of average in Arizona, California, and New Mexico. In Arizona and New Mexico, February warmth prematurely melted some of the high-elevation snowpack, boosting reservoir storage but reducing spring and summer runoff prospects.

MÉXICO: February's rains were much below normal in the country, except in central regions and the southeast due two frontal passages. The low rainfall was thanks to minimal moisture from the Pacific, while some factors that did not allow thunderstorms were the northward displacement of the jet stream and the quick movement of frontal systems, in addition to northwest winds in middle levels of the atmosphere. According to statistics from the National Meteorological Service, Mexico experienced its fifth-driest February in the 75-year record.

Little or no rain promoted increases in drought coverage at regional scales such as the northwest, where Baja California had its second-driest February and its extent of extreme drought increased 3.3% to stand at 11.8%. In Sonora, the abnormally dry area (D0) rose from 13.9 to 52.9%. In the northeast, Tamaulipas recorded its seventh-driest February, while moderate drought (D1) expanded from 0.4 to 2.1%; D1 increased from 2.1% to 17.0% in Nuevo Leon, while abnormal dryness (D0) in that state increased from 24.8% to 37.4%. In the central-north, Durango has the largest increase during February of moderate drought (D1), from 1.2 to 6.3%. In the east, 64.1% of Veracruz was abnormally dry or in moderate drought (D0-D1). In the south, severe to extreme drought (D2-D3) covered 12.6% of Oaxaca, which also experienced its ninth-driest December-February and September-February periods. Moderate drought (D1) also increased in Michoacan (from 1.0 to 5.6%), Guerrero (16.1 to 21.5%), and Chiapas (3.1 to 5.5%). Severe drought (D2) increased to 1.3% in Chiapas, while the Yucatan Peninsula saw the emergence of a new area of moderate drought (D1) in the last 2 weeks. Overall, the country's portion free of drought or dryness decreased in the last month, from 83.8 to 68.2%. Moderate to extreme drought (D1-D3) stood at 6.5%, while abnormally dry conditions (D0) covered 25.2%.

In addition to scarce rainfall, temperatures were warmer than normal in most of the country, with the exception of the south, southeast, and the Yucatan Peninsula. Anomalies greater than 5°C above normal were concentrated in the Western Sierra Madre, the Baja California Peninsula, and the Northeast (Coahuila and Nuevo Leon). Colder-than normal regions, with anomalies between 1-3°C, were mainly located in Veracruz, Tabasco and Yucatán. The February national mean temperature of 14.2°C was 0.6°C above normal and was ranked as fourth warmest, while Baja California, Baja California Sur, Sinaloa, and Sonora—all in the Northwest—in addition to Colima, recorded their warmest February, based on records from 1971.

Regarding agriculture, the Information Service for Agri-food and Fisheries (SIAP) in its February 2016 report, stated that drought and pests were the main causing-losses in about 798.8 thousands hectares grain crops including corn, bean and sorghum. More than a half of this area —56.2%— was concentrated in San Luis Potosi, Guerrero, Michoacán, Chihuahua, Oaxaca and Sinaloa.

The national area burned by fires from January 1 to February 25 was ranked as the third largest since 1998, with 17,621 hectares. Only 22% of that total burned in the same period of 2005, according to the Forest Fires Weekly Report from the National Forestry Commission (CONAFOR). Oaxaca, Sonora, and Guerrero are the main states with greater area burned, reporting 2,793; 2,087; and 1,330 hectares, respectively. Oaxaca was

experiencing moderate to extreme drought (D1-D3) across 36% of its area; Sonora was 52.9% dry (D0) and 1.2% in moderate drought (D1); and Guerrero is 43.2% dry (D0).